REMARKS/ARGUMENTS

Reconsideration of this application and entry of the foregoing amendments are respectfully requested.

The specification has been amended to include reference to SEQ ID NO:4 at the appropriate points on pages 18 and 25, as requested by the Examiner. Claims 61 and 67 have been re-presented in independent form and claim 64 has been amended to conclude with a period.

Claims 58-61 and 67 stand objected to as allegedly being of improper dependent form for failing to limit the subject-matter of a previous claim. Applicants respectfully disagree with the objection for the reasons that follow.

Claim 55 specifies a polypeptide that shows at least 80% sequence similarity to SEQ ID NO:1. In other words, at least 80% of the amino acids of the polypeptide are similar to the corresponding amino acid in SEQ ID NO:1 and the remainder (i.e., up to 20%) of the amino acids of the polypeptide are not similar to the corresponding amino acid in SEQ ID NO:1.

Claim 55, therefore, encompasses polypeptides in which one or more amino acids in the sequence of SEQ ID NO:104 are not similar to the corresponding sequence in SEQ ID NO:1. The presence of SEQ ID NO:104 is not, therefore, inherent in the claimed polypeptides as alleged by the Examiner but is, in fact, only present in a sub-set of the claimed polypeptides. Claim 58 is directed to this specific sub-set of the polypeptides and, therefore, further limits claim 55 by requiring the presence of SEQ ID NO:104 within the sequence of the claimed polypeptide. For similar reasons, claims 59 and 60 also further limit claim 55.

Claims 61 and 67 have been re-written in independent form thereby mooting the objection to these claims.

Reconsideration and withdrawal of the objection are requested.

Claims 55-103 stand rejected under 35 USC §112, first paragraph, as allegedly being non-enabled. Withdrawal of the rejection is submitted to be in order for the reasons that follow.

All nucleic acids within the claimed genus have the function of causing gibberellin antagonized or insensitive growth inhibition. The skilled person would be readily able to determine the presence or absence of a dwarf phenotype and whether this phenotype was affected by gibberellin. For example, the use of gibberellin to treat plants is described on page 6 line 6 to page 7 line 23 of the specification. Furthermore, the claimed sequences are closely related by structure to the reference sequence. This close relationship allows the experimentation required to confirm activity in the manner taught by the specification to be minimized. This level of experimentation is not undue.

In particular, given the teachings of the specification, a skilled person would have no difficulty in identifying sequences that are closely related to the reference sequence (i.e., that have at least 80% sequence identity) and possess the claimed activity. Following the guidance set out in the specification, the skilled person could test a polypeptide for the ability to confer a gibberellin responsive or unresponsive dwarf phenotype using methods that are routine in the art.

In determining whether this amount of experimentation would be undue, *In re Wands* sets out various factors which must be considered. For the reasons set out below, consideration of these factors shows that any experimentation required by the skilled person in practicing the claimed invention would not be undue and the enablement requirement of 35 USC §112, first paragraph, is, therefore, met.

a) The nature of invention/scope of claims

The claimed invention relates to isolated nucleic acid sequences the expression of which in a plant confers growth inhibition. The polypeptide may be a Rht sequence that shares 80% sequence identity with SEQ ID NO:1. The isolated nucleic acid may, for example, hybridize under specified highly stringent conditions with SEQ ID NO:14 or 7. The polypeptide may comprise a giberellin interaction site, such as SEQ ID NO:104, and confer giberellin sensitive growth inhibition or may lack a giberellin interaction site and confer giberellin insensitive growth inhibition.

The genus of nucleic acids covered by these claims is narrow and defined according to a close structural relationship with SEQ ID NO:1. The sequence of SEQ ID NO:1 thus defines and limits the structure of all the members of the genus. The genus is further defined by the specific function of conferring gibberellin sensitive or insensitive dwarfism on a plant.

The invention thus concerns a group of nucleic acid molecules encoding polypeptides that have a close structural relationship (at least 80% sequence identity) and that possess a common activity.

b) Predictability of the art

The techniques of protein engineering are well established in the art and a skilled person could reliably modify a protein sequence as required without difficulty.

Furthermore, a skilled person would be aware of the properties of different amino acid residues and could identify important positions within the polypeptide sequence by routine sequence analysis. The skilled person could thus by and large predict whether or not a particular sequence change would disturb protein function without undertaking any experimentation.

c) Quantity of experimentation necessary

DNA manipulation, cloning and hybridization techniques and assays for testing whether a polypeptide has GA-responsive dwarfing activity are routine in the art.

The repetition of such routine techniques does not put them beyond the level of one of ordinary skill. If they are routine, they are routine and the skilled person could perform them any number of times without intellectual or creative input. It is noted that 'a *considerable amount of experimentation is permissible, if it is merely routine.' (In* re Wands).

Furthermore, the skilled person would not be required to undertake an extensive synthesis and screening program covering every conceivable nucleic acid that might by encompassed by the claims. Given the narrow genus of isolated nucleic acids encompassed by the claims, there is a reasonable expectation that most, if not all, nucleic acids that possess the structural features would have the claimed activity. The skilled person need test only very few hybridizing nucleic acids in order to identify a nucleic acid with the stated activity. The level of experimentation required to test these few nucleic acids using routine techniques would not be undue.

d) Relative skill of those in the art

An artisan in this field would have years of experience in cloning and expressing plant genes, would be familiar with the plant molecular biology literature, and would have the technical skill required to practice the experimentation described in this scientific literature relating to recombinant plant gene expression and the production of transgenic plants.

The skilled person would also be familiar with known methods of testing for gibberellin responsiveness and dwarf phenotypes.

Thus, the skilled person would be experienced in all the techniques that would be required to carry out the claimed invention.

e) Amount of guidance provided

Contrary to the Examiner's assertion, the subject specification includes significant guidance for the skilled person wishing to practice the invention.

Variants and homologues of the sequence of Figure 3b (SEQ ID NO:1) are discussed in detail in the specification, for example, on page 7 line 25 to page 9 line 5 and page 25 line 15 to page 27 line 9. Methods of identifying such variants are described on page 14 line 9 to page 18 line 10. The specification teaches the skilled person how to identify variant sequences in terms of % identity using sequence analysis software from page 19 line 6 to page 21 line 7 and how to identify variant sequences in terms of hybridization to the reference sequence under stringent conditions from page 21 line 23 to page 25 line 14. Page 13 lines 8 to 19 teach the use of antibodies to identify Rht homologues.

Guidance on the cloning and manipulation of Rht variant nucleic acid sequences is provided by the specification on page 9 line 7 to page 12 line 9 and page 31 line 20 to page 33 line 17. Further guidance on the transformation of cells with Rhtl nucleic acid sequences and the production of transgenic plants is provided on page 34 line 5 to page 38 line 13 of the specification.

The skilled person would be readily able to determine the activity of an isolated nucleic acid in a plant by assessing whether or not a dwarf phenotype is produced and whether or not this phenotype is sensitive to gibberellin, i.e., whether or not the plant reverts to wild-type on treatment of the plant with gibberellin. The use of gibberellin is discussed in the specification on page 5 line 17 to page 7 line 23.

In the light of the above, it will be clear that the directions provided in the specification provide guidance sufficient to enable persons skilled in the art to practice the invention as claimed.

f) Existence of worked examples

The specification exemplifies the identification of the Rht gene in wheat and maize and the identification of mutant Rht sequences in dominant mutant alleles on page 45 line 13 to page 50 line 14. Worked examples of the invention are, therefore, provided in the specification.

Furthermore, the Examiner alleges that Applicants have not taught that every 50 nucleotides of the disclosed polynucleotides are sufficient to encode functional polypeptides. However, claim 84, which relates to sequences of at least 50 nucleotides, does not require the sequences to encode a functional protein. Such a nucleotide may be useful, for example, in the suppression of expression, as taught on page 38 line 23 to page 41 line 9 of the specification.

The Examiner also cites Amgen, Inc. v. Chugai Pharmaceutical Co., 18 USPQ 2d 1016 in support of the rejection. However, in this case, at issue was the lack of enablement of a claim in the form 'a DNA sequence encoding protein X'. The court stated:

'It is not sufficient to define it [the DNA sequence] solely by its principal biological property'

In other words, the case relates to the situation where the claim in question contained no structural definition whatsoever. This case is not, therefore, relevant to the instant claims, which recite specific structural features (i.e., sequence similarity to a specific sequence) that are sufficient in themselves to distinguish the invention from the art.

In summary, an analysis of the factors set out in *In re Wands* reveals that no undue experimentation would be required of one skilled in the art to make and use the claimed invention.

As the enablement requirement of 35 USC 112, first paragraph, is met, reconsideration of the rejection is respectfully requested.

Claims 55-104 stand rejected as allegedly representing obviousness-type double patenting over claims 1-31 of USP 6,762,346 (it is believed that USP 6,762,348 was intended). In order to advance prosecution, submitted herewith is a Terminal Disclaimer that moots the rejection.

This application is submitted to be in condition for allowance and a Notice to that effect is requested.

Respectfully submitted,

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